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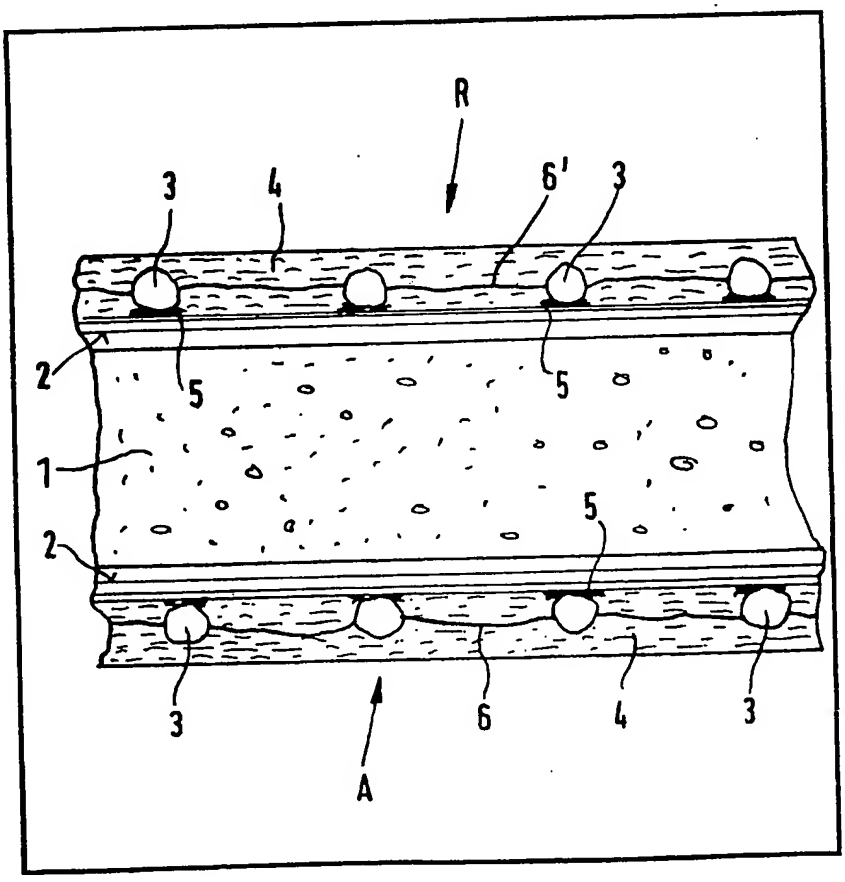
(54) Glass fibre encased plaster core

(57) A building board comprises a plaster core 1 encased by a glass fibre material of sheet form composed of a layer of fabric having a glass filament mesh and a layer of non-woven or tissue material with the layer of fabric disposed towards the plaster core. The layer of non-woven or tissue material preferably increases in density away from the core.



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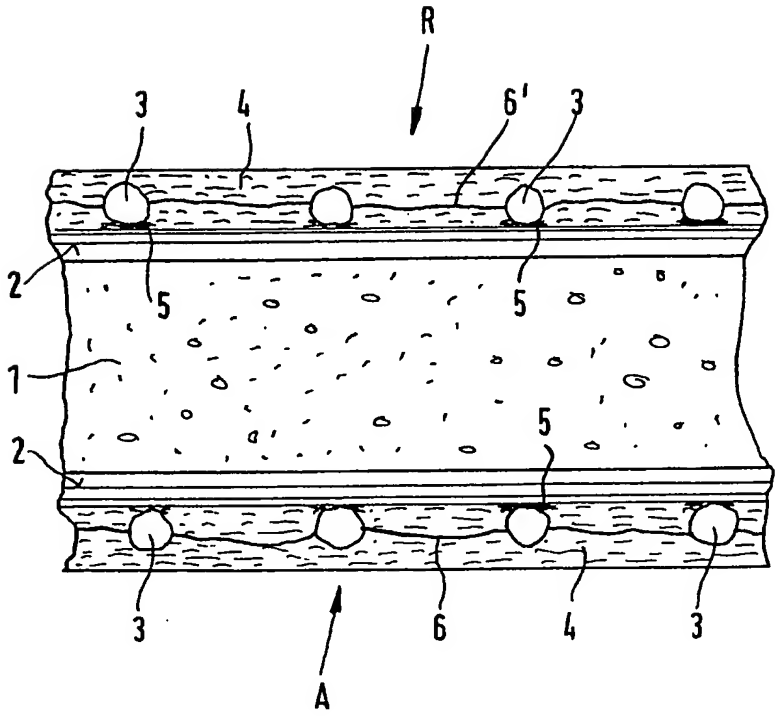
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SPECIFICATION

Plaster building board

This invention relates to a building board or panel having a plaster core encased in glass fibre material.

Building boards of plaster are known in a wide variety of forms. The most common and also best known are building boards of plaster with a cardboard casing. These have found widespread use in the building industry due to their numerous advantages and are generally known as cardboard-cased plasterboards or, more simply, as plasterboards. These plasterboards are usually made in varying thicknesses and in dimensions of 2.50 m to 1.25 m. Such boards are most commonly used as coverings for partition walls in the form of demountable partitions, in which frames are constructed between the floor and the ceiling, such frames consisting of posts, sill and lintel, and the frames are faced on both sides with such plasterboards. The internal space between these boards is usually filled with an acoustically and thermally insulating material. These plasterboards are also widely used on account of their fire protective action. On account of the two molecules of water in the crystal, a plasterboard contains a considerable quantity of water which, when the board is exposed to a high temperature, is gradually released and tends to prevent a rise in the temperature of the board as long as water is still evaporating from the board.

The disadvantage of these known plasterboards is solely that the cardboard casing is combustible. There has been no lack of attempts to replace the combustible cardboard casing by a non-combustible casing. It was obvious that, instead of the combustible cardboard casing, that is a casing of organic material, a casing of inorganic material could be used and thus various proposals have been made for utilizing a glass fabric or glass cloth or a non-woven glass material or tissue for casing such plasterboards instead of cardboard.

It is known that cardboard-cased plasterboards may be made on a machine, to which first the front side cardboard is supplied on a continuously moving, endless conveyor belt, the edges of the cardboard being turned up to form a channel into which a flowable plaster mash is poured. The rear side cardboard is then applied and the entirety is moved forward between shaping rolls to give the product its shape. The plaster mash commences to harden or set and the edges of the first or front side cardboard are folded over and the rear side cardboard is firmly glued thereto.

It would seem desirable to use this well-known machine for the production also of building boards in which the plaster core is encased in a glass fibre-containing product.

The difficulty arose, however, in that neither glass fibre fabric or glass-cloth or non-woven glass fibre material or tissue could be used for encasing the plastic plaster core in this known manner because these materials possess insufficient stability of form, so that large tensile forces could not be applied to strips of such material. It would be possible to counteract this disadvantage by making such material thicker and stronger, but this makes such material much less suitable for bonding to the plaster and also this increase in material is unacceptable for economic reasons. A further disadvantage is that if the mesh of the fabric is too open or the porosity of the non-woven material or tissue is too large, the flowable plaster mash is squeezed out through the mesh or pores during the forming of the board so that a considerable amount of dirt on the machine and conveyor equipment results, rendering the machine sooner or later unusable and requiring it to be cleaned because the squeezed out plaster mash solidifies and becomes hard. This also results in economically unacceptable down times of the plant.

It is also known that such plaster-permeable glass fibre fabric or non-woven glass fibre material may be coated on one side with a paper sheet in such a way that the paper sheet prevents the flowable material from passing through, enables additional forces to be applied and, thirdly, after the product has been manufactured, can be pulled off again so that the casing of the plasterboard is free of combustible material.

Use of the last-mentioned possibility has not become widespread because such a casing material is not only difficult to make and therefore costly, but also requires an additional process stage, namely that of pulling off the paper, and there is always the risk of pulling the applied glass fibre material away from the plaster core, at least locally or at points. It has also been found that the bond or connection between the plaster mash or plaster crystals on the one hand and the smooth glass fibre surface on the other hand is not always satisfactory, due to the differences in the material, namely calcium sulphate dihydrate on the one hand and silicic acid on the other hand.

It is an object of the present invention therefore to provide a building board having a plaster core which is encased in a non-combustible glass fibre material which can be readily processed on a known cardboard-cased plasterboard production machine, which moreover possesses the necessary strength, which bonds adequately to the plaster.

According to the present invention there is provided a building board or panel having a plaster core encased in glass fibre material of sheet form in which the glass fibre material is composed of a layer of fabric and a layer of non-woven or tissue material and the layer of

fabric is disposed towards the plaster core.

The plaster building board is encased on all sides in the manner of a known cardboard-cased plasterboard with a sheet-like material, which is composed of a glass fibre fabric and a non-woven glass fibre material in such a manner that the fabric and the non-woven material together constitute one unit, and that the fabric layer is disposed towards the surface of the plaster core.

Preferably, the layer of non-woven or tissue material is constructed and arranged to have a density which in proximity to the fabric layer is less than that of that part of the layer of non-woven or tissue material more remote from the fabric layer.

The non-woven material is constructed with a varying density, namely with a lower density on the face towards the fabric and a higher density on the outer face so that relatively large pores are present on the side towards the plaster surface, these pores progressively decreasing in size towards the outer face of the non-woven material or tissue so that finally only fine pores remain, the sole purpose of which is to enable the water vapour evaporating as the plasterboard dries out to escape through these pores.

The term glass fibre fabric is used herein to denote a mesh material composed of glass filaments in which a first set of filaments is connected to a second set of filaments, the filaments of the first set extending in a direction inclined to that in which the filaments of the second set extend. Usually the respective directions are normal to each other. The connection between the first and second sets of filaments may be achieved as by weaving but more commonly one set overlies the other and is bonded thereto at the cross-over points.

The individual glass fibres of the fabric and also of the non-woven material may be surface treated, for example they may be roughened, or they can be sprayed with a wetting agent to achieve a more rapid and intimate wetting of the glass fibres by the flowable, water-containing plaster mash, which really is a mash of α—and/or β-semihydrate and only for simplicity is referred to as plaster mash.

With advantage, the plaster mash incorporates fibres and a wetting agent.

The treatment of the encasing glass fibre material with a wetting agent can be carried out in a pre-treatment or it can be carried out immediately before applying of the glass fibre combination onto the plaster core, for example by applying to the side of the material which is to face the plaster core a wetting agent.

The processing of the glass fibre material to form the casing of the plasterboard can be carried out in a manner similar to the known processing of cellulose cardboard in plasterboard production. The plaster mash is also made in essentially the same manner. The fixing of the edges of the encasing glass fibre material onto the the corresponding other or rear sheet is carried out by the use of suitable inorganic or organic adhesives in the usual glue disc application or by using plaster mash in the fusion adhesive application process, depending upon the type and intended purpose of the boards to be produced, or by mechanical combing.

The board accordng to the present invention possesses all the advantages of the known cardboard-cased plasterboard and also the additional advantage of non-combustibility, the visible side of this board possessing such a smooth and architecturally pleasing surface that it does not require any further finishing or coating although, if desired, it can be painted. Furthermore, this glass fibre surface may, if necessary after the application of a primer layer, be coated with additional materials.

One embodiment of the present invention will now be described by way of example, reference being made to the accompanying fragmentary sectional view of a building board constructed according to the invention.

In the accompanying drawing, reference 1 denotes the plaster core, reference 2 glass fibre filaments which extend in the plane of the drawing, reference 3 glass fibre filaments which extend perpendicularly to the plane of the drawing, and reference 4 a layer of non-woven glass fibre material or tissue. The filaments 2 and 3 form a layer of glass fibre or glass cloth and are bonded together at their cross-over points 5.

The layer of glass fibre fabric and the layer of glass fibre tissue constitute a unitary sheet of glass fibre material, the layer 4 of non-woven fibres or tissue entering the mesh of the fabric approximately to the plane passing through the centre of the filaments 3 so as partly to surround the filaments 3 and so that a cavity is left between the glass filaments 2 and that surface of the non-woven material 4 in proximity thereto, this cavity being free of glass fibres of the non-woven material. A similarly constructed sheet of glass fibre material is applied to both faces of the plaster core 1. The material for encasing the board is uniform, that is, the same everywhere.

In the manufacture of the board, the procedure would be the same as in the manufacture of cardboard-cased plasterboard. First of all the "visible side covering" would be fed into the machine, for example the covering referenced generally A. Onto this covering the plaster mash would be distributed, constituting the core 1. As a result of this distributing operation, the plaster mash penetrates into the facing sheet, to about line 6, so that the filament 2 is surrounded by the plaster and also a portion of the layer 4 is penetrated by the flowable plaster mash. When the rear side covering R is applied, the plaster mash is

pressed by the forming operation as far as line 6 into the glass fibre sheet to achieve a similar result in which the filament 2 is surrounded by plaster and the layer 4 is penetrated.

By sizing the glass fibres, in particular the surface of the fabric disposed towards the plaster core, a good mechanical bond can be obtained. This surface of the glass fibre sheet material A or R facing the plaster mash may be treated with a wetting agent, for example by spraying, printing or dipping. By the application of the wetting agent to the glass fibres exposed to the plaster mash, a complete and intimate contact with the plaster mash is obtained, so that not only is the bond between glass fibres and plaster mash in the finished product improved, but also a more rapid and complete penetration and wetting of the water-containing, flowable plaster mash into the glass fibre material takes place during production.

The layer 4 is preferably constructed and arranged to have a density which, in proximity to the fabric layer, is less than that of that part of the layer 4 more remote therefrom. Since layer 4 on the side towards the fabric layer 2, 3 or the plaster core has a large pore size than on its outwardly facing surface, the flowable, water-containing plaster mash can penetrate relatively far into the layer 4. The extent of penetration is indicated by the lines 6 and 6′ in the drawing.

The connection between the layer 4 and the fabric 2, 3 to form the unitary sheet is preferably carried out in such a manner that, in the sheet material, the filaments 3 are embedded in the layer 4 and extend in the intended direction of advance of the sheet material during production of a board according to this invention.

The mesh width of the fabric composed of filaments 2, 3 can vary, but in every case it is adapted to the layer 4. In this connection it may be pointed out that the filaments 2 may be of differing thickness to the filaments 3. The filaments 2, 3 may be coated, sized, flocked or otherwise surface treated.

CLAIMS

1. A building board or panel having a plaster core encased in glass fibre material of sheet form in which the glass fibre material is composed of a layer of fabric and a layer of non-woven or tissue material and the layer of fabric is disposed towards the plaster core.

2. A building board according to Claim 1 in which the layer of non-woven or tissue material is constructed and arranged to have a density which in proximity to the fabric layer is less than that of that part of the layer of non-woven or tissue material more remote from the fabric layer.

3. A building board according to Claim 1 or 2 in which the surface of the layer of fabric disposed towards the plaster core is treated to improve the bond with the plaster core.

4. A building board according to Claim 3 in which the surface of the layer of fabric disposed towards the plaster core is treated with a wetting agent.

5. A building board according to any one of Claims 1 to 4 in which the plaster core is formed from a plaster mash comprising α- and/or β-semihydrate plaster.

6. A building board according to Claim 5 in which the plaster mash incorporates fibres and a wetting agent.

7. A building board according to any one of the preceding claims in which at least one external face of the casing is provided with a surface coating.

8. A building board according to Claim 7 in which the surface coating is a bond-promoting coating.

9. A building board according to any one of the preceding claims in which the layer of fabric material is of mesh form with a first set of filaments extending in one direction and a second set of filaments bonded to the first set and extending substantially normal thereto and the filaments of the first set are of a different thickness to the filaments of the second set.

10. A building board according to Claim 1 constructed and arranged substantially as herein described with reference to the accompanying drawing.

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